Application No. 09/712,610
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REMARKS

In response to an Office Action mailed on April 29, 2004, Applicant respectfully requests that the above-listed Amendments be entered and the Application be reconsidered in light of the following remarks. With entry of the above-listed Amendments, claims 1, 10 and 19 are amended; claims 2, 11 and 20 are canceled; and claims 3-9, 12-18 and 21-27 are original. Thus, 24 claims are presented for examination. Of these, claims 1, 10 and 19 are independent, and the remaining claims are dependent.

The Examiner rejected Claims 1-27 under 35 U.S.C. 103(a) as being obvious over US Pat. No. 6,545,982 to Murphy, et al. ("Murphy") in view of US Pat. No. 6,580,715 to Bare ("Bare"). The Applicant notes that the third paragraph on page 3 of the Office Action refers to a third reference ("Muller"), however Paragraph 3 of the Office Action does not list Muller. On July 23, 2004, the undersigned telephoned the Examiner to seek clarification of this apparent discrepancy. The Examiner advised that the reference to Muller is a typographical error, and that this reference should be interpreted as being to Murthy. The reference to Muller is so interpreted hereinbelow.

Murthy discloses a multi-port, packet-based bridge that supports monitoring of data packets that are received over one or more designated ports of the bridge. Murthy's system sends copies of the data packets to a specially designated monitoring port, as well as forwarding the packets to their respective destinations, as indicated by their respective destination addresses. Thus, Murthy's system allows packet traffic arriving over several ports to be monitored simultaneously at a single port, i.e. the

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monitoring port, by connecting a monitoring device to the monitoring port.

Bare discloses a switch-to-switch protocol for network load balancing. The protocol provides a specially formatted "hello" packet that is periodically sent out over all ports of a "load balance" switch to inform remote load balance switches that a load balance switch exists on the other end of a link. Hello packets are also used to detect illegal topologies. (C16, L57 to C17, L4.)

The Examiner cited Murthy (C6, L32-59) as disclosing "monitoring an intra-hub communication path of a network hub to detect a first data unit on said intra-hub communication path having a destination address matching a first predetermined address," as recited in claim 1.

First, it is believed that Murthy does not disclose "an intra-hub communication path." As shown in Figure 1, Murthy's bridge 1 includes ports 3 (numbered 0-5). The bridge examines and evaluates packet transmissions on its ports. (C6, L35-36, emphasis added.) Nowhere, however, does Murthy show "an intra-hub communication path of a network hub." In contrast, the present Application discloses an intra-hub communication path. For example, in the embodiment shown in Fig. 1, Bridges A, B and C (16, 18 and 19) are interconnected by a Switching Fabric 14 and three point-to-point connections 12, 13 and 15.

Second, it is believed that Murthy does not disclose "monitoring ... to detect a first data unit ... having a destination address matching a first predetermined address." In the portion cited by the Examiner, Murthy discloses forwarding certain received packets (i.e., packets that have the Broadcast/Multicast flag 21 (Figure 3) set to one) to all attached

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ports, except the ports on which the packets were received. It is believed that a "first predetermined address," as recited in claim 1, does not read on a destination address that has the Broadcast/Multicast flag 21 set to a one, because many different destination addresses can have this flag set to a one. As Murthy describes at C5, L28-38, if the remaining bits of the destination address (the Broadcast/Multicast address 24 (Figure 3)) are all ones, then the destination address is considered to designate all stations in the network. On the other hand, if the remaining bits of the destination address are not all ones, the remaining bits signify a subset of stations in the network that are destinations. Since there can be many bit patterns (that are not all ones) in the remaining bits of the destination address, the remaining bits of the destination address can specify many different subsets of stations. Thus, Murthy does not disclose "monitoring ... to detect a first data unit ... having a destination address matching a first predetermined address."

The Examiner cited Murthy (C7, L34-40) as disclosing "storing a source MAC address of said detected first data unit," as recited in claim 1. In the portion cited by the Examiner, Murthy discloses adding a new entry to a Bridging Table 25, if the source address 16 of a received packet does not match a Station Address field 27 of any existing Bridging Table entry 26. In other words, Murthy describes how a bridge "learns" the correspondence between attached stations and the ports to which they are attached. (C7, L44-46.) There is no connection between the detection of the Broadcast/Multicast flag 21 described above and this learning activity. The detection of the Broadcast/Multicast flag 21 does not trigger the storage of the source MAC address in the Bridging

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Table. In Murthy, these two activities are completely independent of one another. In contrast, the claim recites, "storing a source MAC address of said detected first data unit," i.e. there is a connection between detecting the first data unit and storing the source MAC address of the detected first data unit.

The Examiner cited Murthy (C9, L4-8) as disclosing "monitoring said plurality of external communication ports to detect a second data unit having a destination address matching said first predetermined address received at a respective one of said plurality of external communication ports," as recited in claim 1. However, the portion of Murthy cited by the Examiner merely reiterates some of the forwarding capabilities of a bridge, for example "[f]orwarding of multicast and broadcast packets to more than one port and possibly all ports." Nowhere does Murthy disclose "monitoring said plurality of external communication ports to detect the second data unit having a destination address matching said first predetermined address received at a respective one of said plurality of external communication ports."

The Examiner cited Bare (C 20, L6-20) as disclosing "in the event that said source MAC address of said second detected data unit matches said stored source MAC address, disabling operation of said respective one of said plurality of external communication ports at which said second detected unit was received," as recited in claim 1. Bare uses hello packets to detect illegal topologies. (C16, L57 to C17, L4.)

Bare's hello packet is of an entirely different format than the recited first and second data units. All of Bare's load balancing switch-to-switch packets, including hello packets, use a unicast packet format, in which the destination MAC address 402

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(Fig. 4) is set to a unique destination MAC address. (C14, L11-18.) Thus, each hello packet is addressed to a single, unicast address. In contrast, in the presently disclosed system, the destination address in the detected first data unit is a bridge multicast address, as recited in amended claim 1.

Although Bare discloses a protocol for detecting loops, Bare relies on the specially formatted hello packet 500 to detect these loops, and Bare's system uses the hello packets differently than the claimed invention uses the recited first and second data units. In Bare's system, if two ports of a switch are connected to each other (such as by a loop formed by a hub connected to the two ports), hello packets sent out by the switch over one of the ports return to the switch over the other port. Upon receiving the returned hello packets, the switch recognizes the packets and blocks one of the ports. (C19, L59-65.) Hello packets are, however, considerably different than the first and second data units recited in amended claim 1.

The hello packet contains a source MAC address that is unique to each port, rather than the switch's MAC address. Thus, a non-load balance switch that forms a loop with one of Bare's switches does not see identical switch addresses in hello messages it receives from different ports of Bare's switch. According to Bare, this is done to prevent shutting down at least one of the ports. (C17, L7-20.) In contrast, in the presently disclosed system, the source MAC address is either the MAC address of the switching fabric within the network hub (i.e. the switch's MAC address) or a source address contained in a bridge protocol data unit (BPDU) that is received from another switch or hub. (Application: P11, L28 to P12, L9.) In the presently disclosed system, the switch's

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MAC address is used so that loops can be detected and shutdown. Thus, Bare teaches away from the presently disclosed invention.

Furthermore, the claim clause that the Examiner cited as reading on Bare (C20, L6-20) recites a "second detected data unit," however Bare does not disclose monitoring to detect a second data unit having a destination address matching a first predetermined address. Bare's system detects hello packets based on a "Switch ID" 506 (Fig. 5), which is separate from both the source address 404 (Fig. 4) and the destination address 402. (See, C19, L59-64) Thus, Bare does not disclose any processing that involves a "second detected data unit," as recited in claim 1.

Thus, no art of record, either alone or in combination, discloses or suggests a method for preventing bridge loops, as recited in amended claim 1. For at least this reason, claim 1 is believed to be allowable.

Claims 3-9 depend directly or indirectly from claim 1. Claims 3-9 are, therefore, believed to be allowable, for at least the reasons discussed above with respect to claim 1.

The Examiner rejected claims 10-18 under the same rationale as claims 1-9. As discussed above respect to claim 1, the art of record, either alone or in combination, does not disclose or suggest apparatus for eliminating loops, as recited in amended claim 10. Claims 12-18 depend directly or indirectly from claim 10 and are, therefore believed to be allowable, for at least the reasons discussed above with respect claim 10.

The Examiner rejected claims 19-27 under the same rationale as claims 1-9. As discussed above respect to claim 1, the art of record, either alone or in combination, does not disclose or suggest a system for eliminating loops, as recited in amended

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claim 19. Claims 21-27 depend directly or indirectly from claim 19 and are, therefore believed to be allowable, for at least the reasons discussed above with respect claim 19.

For all the foregoing reasons, it is respectfully submitted that the present Application is in a condition for allowance, and such action is earnestly solicited. The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present Application.

Respectfully submitted,

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